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Short Communication

High Prevalence of Metallo-β-Lactamase-Producing Acinetobacter baumannii in a Teaching Hospital in Tabriz, Iran

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SUMMARY: Metallo-β-lactamase (MBL)-producing Acinetobacter baumannii has become a growing therapeutic concern worldwide. The aims of this study were to evaluate the antimicrobial susceptibility of A. baumannii isolates and to determine the prevalence of MBL genes among carbapenem non-susceptible isolates. During a period of 16 months (March 2008–June 2009), 100 isolates of A. baumannii were collected from different clinical specimens of inpatients admitted to the largest teaching hospital in the northwest of Iran. All isolates were tested for antimicrobial susceptibility by Kirby-Bauer disk diffusion method. Carbapenem non-susceptible isolates were further screened for production of MBL by Etest and were then subjected to PCR for detection of MBL genes of types bla_{IMP} and bla_{VIM}. Among 63 carbapenem (imipenem and meropenem) non-susceptible isolates of A. baumannii, 31 (49 %) were found to be MBL producers. Of 31 MBL-producing isolates, 19 (61 %) carried the bla_{IMP} gene and 9 (29 %) carried the bla_{VIM} gene. All MBL-producing isolates were multidrug resistant. This is the first report of IMP and VIM types among MBL-producing A. baumannii in Iran.

Acinetobacter baumannii is a significant opportunistic pathogen. It is widely distributed in the hospital environment and causes a wide range of infections, particularly respiratory tract infections, urinary tract infections, meningitis, septicemia, and wound infections (1). Antimicrobial treatment of nosocomial infection caused by A. baumannii is often difficult due to the multidrug-resistant (MDR) nature of this organism. The scope of MDR was defined as those isolates that are resistant to more than two different classes of the antimicrobial agents that include cephalosporins, carbapenems, aminoglycosides, fluoroquinolones, and ampicillin-sulbactam. Carbapenems are usually the drug of choice for treatment of infections caused by MDR A. baumannii (2). In recent years, some outbreaks of carbapenem-resistant A. baumannii have been reported from different parts of the world (3–5). Carbapenem-hydrolyzing metallo-β-lactamases (MBLs) belong to class B β-lactamases which can hydrolyze all β-lactams except monobactams. The IMP and VIM are the most prevalent types of acquired MBLs (6). Nowadays, the MBL-producing A. baumannii is a major concern to clinicians. There have as yet been no reports concerning the MBL-producing A. baumannii in Iran. The aims of this study were (i) to access the antimicrobial susceptibility of A. baumannii isolated from Imam Reza hospital in Tabriz and (ii) to determine the prevalence of MBL genes among carbapenem non-susceptible isolates.

This study was carried out at a 1,000-bed tertiary-care hospital in Tabriz, Iran, the largest teaching hospital in the northwest of Iran. One hundred non-duplicated clinical isolates were collected during a period of 16 months between March 2008 and June 2009 from patients admitted to the hospital. The isolates were identified using standard laboratory methods (5) and then confirmed by detection of $bla_{OXA\text{-}51\text{-}like}$ carbapenemase genes as described previously (7). A total of 100 A. baumannii isolates were obtained from different clinical specimens, including tracheal aspirate (37 %), urine (21 %), sputum (9 %), blood (7 %), catheter (6 %), bronchial washings (6 %), wounds (5 %), abscess drainage (3 %), cerebrospinal fluid (2 %), ascites (2 %), and pleural effusion (2 %). Seventy-two patients (72 %) were males and 28 (28 %) were females. Their ages ranged from 14 to 86 years with a median of 52 years. The isolates were cultured from patients in intensive care units (38 %) and internal medicine (24 %), neurosurgery (17 %), infectious disease (9 %), neurology (8 %), and general surgery (3 %) wards. Antimicrobial susceptibility of all isolates was determined using the standard Kirby-Bauer disk diffusion method according to Clinical and Laboratory Standards Institute (CLSI) guidelines (8). The antimicrobial agents tested were ampicillin-sulbactam (10/10 μg), piperacillin-tazobactam (100/10 μg), amoxicillin/clavulanic acid (20/10 μg), ticarcillin/clavulanic acid (75/10 μg) , ceftriaxone (30 μg), cefepime (30 μg), ceftazidime (30 μg), piperacillin (100 μg), aztreonam (30 μg), imipenem (10 μg), meropenem (10 μg), gentamicin (10 μg), ciprofloxacin (5 μg), levofloxacin (5 μg), amikacin (30 μg), and trimethoprim/sulfamethoxazole (25 μg). All antimicrobials were purchased from Mast, Merseyside, UK. Pseudomonas aeruginosa ATCC 27853 was used as the control strain in susceptibility testing. The isolates

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